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10/514,196	11/12/2004	Tomohisa Arai	086531-0138	4571

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EXAMINER	
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ART UNIT	PAPER NUMBER
1742	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/514,196	ARAI ET AL.	
	Examiner	Art Unit	
	Kathleen A. McNelis	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 November 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/12/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claims Status

Claims 1-8 remain for examination wherein claims 7 and 8 are amended.

Examiner's Comments

Based on a telephone conversation with Mr. Schwaab on 5/14/2007, of the two sets of claims with file date 11/12/2004, the set with the attorney docket number in the header is to be examined.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor

and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese patent document 01-156445 (JP '445)[1] as evidenced by ASTM Standard E 140-07 (ASTM E-140).

With respect to claims 1-8, JP '445 discloses a cutting tool made of an alloy composed of 30-45 wt% Cr, 2.5-6.0 wt% Al and remaining portion nickel (JP '445 claim 2). JP '445 discloses a highly rigid cutting tool excellent in anti-corrosiveness and workability (p. 3 of translation). In embodiment Example 1 (page 7 of translation), an alloy with composition 38 % Cr, 3.8 % Al and balance Ni is reported to have a hardness of 650 Hv. 38% Cr is within the claimed range of 32 to 44 wt% and 3.8% Al is within the claimed range of 2.3 to 6 mass %.

ASTM Standard E 140 Table 3 shows that a hardness of 513 Hv for a nickel or high-nickel alloy corresponds to 50.0 on a Rockwell Hardness C scale (p. 6). The value of 650 Hv therefore corresponds to a hardness of > 50 HRC which overlaps the claimed range of 52 or more; therefore a prima facie case of obviousness exists (see M.P.E.P. § 2144.05).

Although JP '445 does not recite the addition of at least one element selected from Zr, Hf, V, Ta, Mo, W and Nb as recited in claim 1, no minimum limit is recited in the instant claims for these elements therefore the addition is considered optional and the required amount of addition is presumed to be zero. Since JP '445 does not recite the addition of these elements, the amount of each element is assumed to range from zero to impurity levels, which is within or overlapping the instant claimed ranges of 0-1 % Zr, Hf, V and Nb or 0-2% Ta or 0-10% Mo + W.

[1] Based on English translation.

The equation recited in claim 2 is satisfied since the amounts of Zr, Hf, V, Nb Ta, Mo and W = 0 to impurity levels can be selected that when substituted into the equation result in a value of zero, which is less than 10 mass %. Further, it is well settled that there is no invention in the discovery of a general formula if it covers a composition described in the prior art, In re Cooper and Foley 1943 C.D. 357, 553 O.G. 177; 57 USPQ 117, Taklatawalla v. Marburg, 620 O.G. 685, 1949 C.D. 77 and In re Pilling 403 O.G. 513, 44 F(2) 878, 1931 C.D. 75. In the absence of evidence to the contrary, the selection of the proportions of elements would appear to require no more than routine investigation by those ordinarily skilled in the art. In re Austin, et al., 149 USPQ 685, 688.

Although JP '445 does not recite the addition of 1.2 mass percent or less of Ti as in instant claim 3, no minimum limit is recited in the instant claim for the titanium addition, therefore the addition is considered optional and the lower limit for Ti is presumed to be zero. Since JP '445 does not recite the addition of Ti the amount of each element is assumed to be zero to impurity levels, which is within or overlapping the instant claimed ranges of 0-1.2 % Ti

Although JP '445 does not recite the addition 5 mass percentage or less of Fe as recited in claim 4, no minimum limit is recited in the instant claim for the iron addition, therefore the addition is considered optional and the lower limit for Fe is presumed to be zero. Since JP '445 does not recite the addition of Fe the amount of each element is assumed to be zero to impurity levels, which is within or overlapping the instant claimed ranges of 0-5 % Fe.

Although JP '445 does not recite that the alloy additionally contains 0.1 % or less C, 0.05% or less Mn, 0.005 % or less P, 0.005 % or less O, 0.003% or less S, 0.02% or less Cu and 0.05% or less Si where the total content of P, O and S is 0.01% or less and the total content of Mn, Cu and Si is 0.05% or less as in instant claim 5, since JP '445 does not recite these elements they

are presumed to be zero or present at trace impurity levels. Such levels would be within, overlapping or close enough to the claimed ranges that one of ordinary skill in the art would expect the same results (see M.P.E.P. § 2144.05).

Although JP '445 does not recite that the alloy additionally contains 0.025 % or less Mg, 0.02% or less Ca, 0.03% or less B, 0.02 % or less rare earth elements including Y when the total of Mg + Ca + B is 0.015 % or more or when the total content of Mg+ Ca+ B is 0.015 % or more then the total content of P, O and S is 0.003 % or less as in instant claim 6, since JP '445 does not recite these elements they are presumed to be zero or present at trace impurity levels. Such levels would be within, overlapping or close enough to the claimed ranges that one of ordinary skill in the art would expect the same results (see M.P.E.P. § 2144.05).

Although JP '445 does not recite that the Ni-Cr alloy comprises a texture wherein three phases including a Cr-rich α phase, an Ni-rich γ phase or a Ni_3Al phase γ' as recited in claim 7, or that the average grain size of the alloy is 1 mm or less as in instant claim 8, such would be expected since the JP '445 discloses an alloy meeting the Ni, Cr, Al composition and properties as recited by claim 1, and further based on similarities in processing methods between the instant invention and JP '445 as follows:

- Compositions: The composition disclosed by JP '445 is essentially the same as claimed alloy, see above regarding claim 1,
- The instant invention discloses solution heat treatment at a temperature of 1000 to 1300 °C to produce a blank with hardness Hv of 300 or less (p. 16 or specification). JP '445 discloses solution heat treatment at 1200 °C to produce Hv 150 (p. 4 of translation).
- The instant invention discloses aging treatment at 550 to 800 °C to form the desired phases and produce a hardness of HRC 52 or more (pp. 16-17 of specification). JP

'445 discloses aging heat treatment at 600 to 650 °C resulting in a hardness of about 689 Hv (i.e. > HRC 50) (p. 4 of translation).

- Properties: The final hardness of JP '445 is essentially the same as the instant claimed invention, see above regarding claim 1.

Since the composition of the alloy and final properties disclosed by JP '445 is essentially the same as the claimed invention, and since the heat treatment processing steps are essentially the same as the disclosed instant invention, the microstructure would be essentially the same.

Claims 1-4 and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese patent document 01-156445 (JP '445) as evidenced by ASTM Standard E 140-07 (ASTM E-140) and in view of Sugahara et al. (U.S. Pat. No. 5,529,642).

With respect to claims 1-4 and 6-8, JP '445 discloses a cutting tool made of an alloy composed of 30-45 wt% Cr, 2.5-6.0 wt% Al and remaining portion nickel (JP '445 claim 2). JP '445 discloses a highly rigid cutting tool excellent in anti-corrosiveness and workability (p. 3 of translation). In embodiment Example 1 (page 7 of translation), an alloy with composition 38 % Cr, 3.8 % Al and balance Ni is reported to have a hardness of 650 Hv. 38% Cr is within the claimed range of 32 to 44 wt% and 3.8% Al is within the claimed range of 2.3 to 6 mass %.

ASTM Standard E 140 Table 3 shows that a hardness of 513 Hv for a nickel or high-nickel alloy corresponds to 50.0 on a Rockwell Hardness C scale (p. 6). The value of 650 Hv therefore corresponds to a hardness of > 50 HRC, therefore the alloy of JP '445 would be expected to have a hardness of at least 50 HRC or more. The value of at least 50 HRC overlaps the claimed range of 52 or more; therefore a prima facie case of obviousness exists (see M.P.E.P. § 2144.05).

JP '445 does not disclose the addition of at least one element selected from Zr, Hf, V, Ta, Mo, W and Nb as recited in claims 1 and 2 or Ti as recited in claim 3 or the addition of Fe as recited in claim 4 or Mg, Ca and B as in claim 6.

Sugahara et al. discloses a nickel based alloy with excellent anti-corrosion properties and workability (abstract) suitable for such applications as cutter blades (col. 1 lines 8-20).

With respect to claims 1 and 2, Sugahara et al. discloses that the alloy contains 15-35% Cr and 6-24% Mo where the total of Cr + Mo is no greater than 43 wt% (col. 2 lines 1-13). The addition of between 6 and 24% **Mo** improves anti-corrosion properties without substantial deterioration in hot workability (col. 3 lines 45-62). The range of 6 to 24% overlaps the claimed range of 10% or less. It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Mo as taught by Sugahara et al. to the alloy of JP '445 to improve the anti-corrosion properties as taught by Sugahara et al. and as desired in JP '445. Further, the use of between 6 and 10% Mo would have been obvious to one of ordinary skill in the art at the time the invention was made since Sugahara et al. discloses equal utility over the range of between 6 and 24%, therefore a prima facie case of obviousness exists (see M.P.E.P § 2144.05).

Sugahara et al. discloses the addition of between 0.002 and 0.01 wt% **Zr** to improve hot workability (col. 5 lines 29-42). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add between 0.002 and 0.01 wt% Zr as taught by Sugahara et al. to the alloy of JP '445 to improve hot workability as taught by Sugahara et al. The range of 0.002 and 0.01 wt% Zr is within the claimed range of one mass percent or less.

Sugahara et al. discloses the addition of between 0.2 to 1 wt% **Hf** to enhance anti-corrosion properties (col. 6 lines 7-25). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add between 0.2 to 1 wt% Hf as taught by Sugahara et al. to the

alloy of JP '445 to improve anti-corrosion properties as taught by Sugahara et al. The range of 0.2 to 1 wt% Hf is within the claimed range of one mass percent or less.

Sugahara et al. discloses the addition of between 0.2 to 0.4 wt% **V** to enhance hot workability (col.5 line 59 – col. 6 line 6). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add between 0.2 to 0.4 wt% V as taught by Sugahara et al. to the alloy of JP '445 to improve hot workability as taught by Sugahara et al. The range of 0.2 to 0.4 wt% V is within the claimed range of one mass percent or less.

Sugahara et al. discloses the addition of between 1.3 to 3.4 wt% **Ta** to enhance anti-corrosion properties (col. 3 line 62 – col. 4 line 20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Ta as taught by Sugahara et al. to the alloy of JP '445 to improve anti-corrosion properties as taught by Sugahara et al. The range of 1.3 to 3.4 overlaps the claimed range of 2% or less, therefore a prima facie case of obviousness exists (see M.P.E.P § 2144.05).

Sugahara et al. discloses the addition of between 0.2 to 2 wt% **W** to enhance anti-corrosion properties (col. 5 lines 44-57). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add between 0.2 to 2 wt% W as taught by Sugahara et al. to the alloy of JP '445 to improve anti-corrosion properties as taught by Sugahara et al. The range of 0.2 to 2 wt% W is within the claimed range of 10 mass percent or less.

Sugahara et al. discloses the addition of between 0.15 to 0.5 wt% **Nb** to enhance anti-corrosion properties (col. 5 lines 44-57). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add between 0.15 to 0.5 wt% Nb as taught by Sugahara et al. to the alloy of JP '445 to improve anti-corrosion properties as taught by Sugahara et al. The range of 0.15 to 0.5 wt% Nb is within the claimed range of 1 mass percent or less.

With respect to claim 2, compositions can be selected from the ranges disclosed in JP '445 as evidenced by ASTM E-140) and in view of Sugahara et al. that satisfy the formula. Further, it is well settled that there is no invention in the discovery of a general formula if it covers a composition described in the prior art, In re Cooper and Foley 1943 C.D. 357; 553 O.G. 177; 57 USPQ 117, Taklatawalla v. Marburg, 620 O.G. 685, 1949 C.D. 77 and In re Pilling 403 O.G. 513, 44 F(2) 878, 1931 C.D. 75. In the absence of evidence to the contrary, the selection of the proportions of elements would appear to require no more than routine investigation by those ordinarily skilled in the art. In re Austin, et al., 149 USPQ 685, 688.

With respect to claim 3, Sugahara et al. discloses the addition of between 0.08 to 0.4 wt% **Ti** to enhance hot workability (col.5 line 59 – col. 6 line 6). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add between 0.08 to 0.4 wt% Ti as taught by Sugahara et al. to the alloy of JP '445 to improve hot workability as taught by Sugahara et al. The range of 0.08 to 0.4 wt% Ti is within the claimed range of 1.2 mass percent or less.

With respect to claim 4, Sugahara et al. discloses the addition of between 0.05 to 4 wt% **Fe** to enhance hot workability (col.5 lines 15-27). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add between 0.05 to 4 wt% Fe as taught by Sugahara et al. to the alloy of JP '445 to improve hot workability as taught by Sugahara et al. The range of 0.05 to 4 wt% Fe is within the claimed range of 5 mass percent or less.

With respect to claim 6, Sugahara et al. discloses including **Mg** at a level of 0.001 to 0.3 wt% to improve workability (col. 6 lines 62-67), **Ca** at between 0.002 to 0.009 wt% and **B** at 0.002 to 0.01 wt% to improve hot workability (col. 5 lines 29-42). Further, Sugahara et al. discloses optionally adding between 0.01 to 0.1 wt% La, Ce and Y (i.e. rare earth elements) (col. 6 lines 42-55). The range of 0.002 to 0.009 wt% Ca is within the claimed range of 0.02 or less. The

range of 0.002 to 0.01 wt% B is within the range of 0.03 % or less. The range of 0.001 to 0.3 wt% Mg overlaps the claimed range of 0.025 % or less; therefore a prima facie case of obviousness exists (see M.P.E.P § 2144.05). Further, concentrations of Mg, Ca and B can be selected from the ranges disclosed by Sugahara et al. that are within the total amount of less than 0.03 % and less than 0.015 %. The range of 0.01 to 0.1 wt% La, Ce and Y overlaps the claimed range of 0.02 mass percent or less, therefore a prima facie case of obviousness exists (see M.P.E.P § 2144.05). Further, the addition of La, Ce and Y is optional; therefore including less than the 0.01 % disclosed by Sugahara et al. would also have been obvious to one of ordinary skill in the art at the time the invention was made.

Although JP '445 in view Sugahara et al. of does not recite that the Ni-Cr alloy comprises a texture wherein three phases including a Cr-rich α phase, an Ni-rich γ phase or a Ni_3Al phase γ' as recited in claim 7, or that the average grain size of the alloy is 1 mm or less as in instant claim 8, such would be expected since the JP '445 discloses an alloy meeting the Ni, Cr, Al composition and properties, and due to similarities in processing methods between the instant invention and JP '445 as follows:

- Compositions: Essentially the same, see above regarding claim 1,
- The instant invention discloses solution heat treatment at a temperature of 1000 to 1300 °C to produce a blank with hardness Hv of 300 or less (p. 16 or specification). JP '445 discloses solution heat treatment at 1200 °C to produce Hv 150 (p. 4 of translation).
- The instant invention discloses aging treatment at 550 to 800 °C to form the desired phases and produce a hardness of HRC 52 or more (pp. 16-17 of specification). JP '445 discloses aging heat treatment at 600 to 650 °C resulting in a hardness of about 689 Hv (i.e. > HRC 50) (p. 4 of translation).
- Properties: The final hardness of JP '445 is essentially the same range as the instant claimed invention, see above regarding claim 1.

Since the composition of the alloy and final properties disclosed by JP '445 is essentially the same as the claimed invention, and since the heat treatment processing steps are essentially the same as the disclosed instant invention, the microstructure would be essentially the same.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese patent document 01-156445 (JP '445) as evidenced by ASTM Standard E 140-07 (ASTM E-140) and in view of Sugahara et al. (U.S. Pat. No. 5,529,642), the Metals Handbook and Kudo et al. (U.S. Pat. No. 4,400,349).

With respect to claim 5, JP '445 discloses a cutting tool made of an alloy composed of 30-45 wt% Cr, 2.5-6.0 wt% Al and remaining portion nickel (JP '445 claim 2). JP '445 discloses a highly rigid cutting tool excellent in anti-corrosiveness and workability (p. 3 of translation). In embodiment Example 1 (page 7 of translation), an alloy with composition 38 % Cr, 3.8 % Al and balance Ni is reported to have a hardness of 650 Hv. 38% Cr is within the claimed range of 32 to 44 wt% and 3.8% Al is within the claimed range of 2.3 to 6 mass %.

ASTM Standard E 140 Table 3 shows that a hardness of 513 Hv for a nickel or high-nickel alloy corresponds to 50.0 on a Rockwell Hardness C scale (p. 6). The value of 650 Hv therefore corresponds to a hardness of > 50 HRC, therefore the alloy of JP '445 would be expected to have a hardness of at least 50 HRC or more. The value of at least 50 HRC overlaps the claimed range of 52 or more; therefore a prima facie case of obviousness exists (see M.P.E.P. § 2144.05).

JP '445 does not disclose the addition of C, Mn, P, O, S, Cu, Si, P, O and S as in claim 5.

Sugahara et al. discloses a nickel based alloy with excellent anti-corrosion properties and workability containing chromium and molybdenum (abstract) suitable for such applications as cutter blades (col. 1 lines 8-20). Sugahara et al. discloses the further optional addition of no greater than 0.1 wt% **C**, no greater than 3 wt% **Mn**, no greater than 4 wt% **Cu**, no greater than 0.3

wt% **Si** (abstract) and no more than 0.01 wt% **S** (col. 6 lines 56-62), where the range of no greater than 0.1 wt% C overlaps the claimed range of 0.1 mass % or less, the range of no greater than 3 wt% Mn overlaps the claimed range of 0.05 wt% or less, the range of no greater than 4 wt% Cu overlaps the claimed range of 0.02 % or less, the range of no greater than 0.3 wt% Si overlaps the claimed range of 0.05 wt% or less, and the range of no more than 0.01 wt% S overlaps the claimed range of no greater than 0.003 wt%, therefore a prima facie case of obviousness exists (see M.P.E.P. § 2144.05). Further, since the addition of C, Mn, Cu and Si is disclosed by Sugahara et al. as optional and are not recited in JP '445, the omission or elimination of these elements would also have been obvious to one of ordinary skill in the art at the time the invention was made.

Since neither JP '445 nor Sugahara et al. discloses the addition of **O** or **P**, the omission of these elements would have been obvious to one of ordinary skill in the art at the time the invention was made. Further, the Metals Handbook (pp. 1027 – 1028) teaches that oxygen is deleterious to superalloys containing aluminum or titanium due to oxidation of these elements and Kudo et al. teaches that phosphorous is a deleterious impurity in Ni-Cr containing alloys (abstract and col. 3 lines 35-39), therefore further reduction of the amounts of O and P would have been an obvious modification to one of ordinary skill in the art at the time the invention was made.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese patent document 01-156445 (JP '445) as evidenced by ASTM Standard E 140-07 (ASTM E-140) as applied to claim 1 and further in view of Hertzberg (1995).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Japanese patent document 01-156445 (JP '445) as evidenced by ASTM Standard E 140-07 (ASTM E-140) and in view of Sugahara et al. (U.S. Pat. No. 5,529,642) as applied to claim 1 and further in view of Hertzberg (1995).

JP '445 as evidenced by ASTM E-140 is applied as discussed above regarding claim 1.

JP '445 as evidenced by ASTM E-140 in view of Sugahara et al. is applied as discussed above regarding claim 1.

Alternatively, JP '445 as evidenced by ASTM E-140 or JP '445 as evidenced by ASTM E-140 in view of Sugahara et al. does not disclose that the average grain size is 1 mm or less.

Hertzberg (1995) teaches in equation 4-7 that grain size is a result effective variable, affecting the yield strength of a material (p. 129), therefore optimization of such would have been obvious to one of ordinary skill in the art at the time the invention was made (see M.P.E.P 2144.05, II, B). It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize grain size in the alloy of JP '445 as evidenced by ASTM E-140 or JP '445 as evidenced by ASTM E-140 in view of Sugahara et al. as a variable affecting yield strength as taught by Hertzberg (1995).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kathleen A. McNelis whose telephone number is 571 272 3554. The examiner can normally be reached on M-F 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KAM
06/14/2007

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